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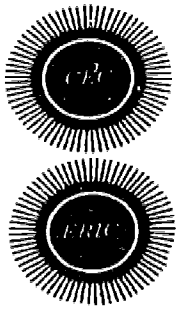
ABSTRACT

Seventy-two references selected from Exceptional Child Education Abstracts are included in the annotated bibliography on programed instruction, one in a series of over 50 similar listings dealing with handicapped and gifted children. Given for all entries, which include texts, journal articles, and many research reports, are bibliographic data, availability information, indexing and retrieval descriptors, and an abstract. Author and subject indexes to the bibliography are provided. (KW)



# PROGRAMED INSTRUCTION

## A Selective Bibliography

February 1971



CEC Information Center on Exceptional Children
The Council for Exceptional Children
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# ABSTRACTS

### ABSTRACT 10133

EC 01 0133 ED N.A.
Publ. Date Mar 67 127p.
Holland, Audrey L.
**Training Speech Sound Discrimination in Children Who Misarticulate, a Desmonstration of the Use of Teaching Machine Techniques in Speech Correction.**
Pittsburgh Univ., Pennsylvania
OEG-5-0976-4-11-3
EDRS mf,hc

Descriptors: exceptional child research; speech handicapped; programed instruction; speech therapy; articulation (speech); auditory discrimination; teaching machines; speech instruction; speech improvement; demonstration projects; programed materials

The results of a 2-year demonstration project in which 51 school age children (ages 6-14) with functional articulation disorders routinely received auditory discrimination training by programed instruction in an actual clinical setting are reported. Auditory discrimination programs (total 65) for the 10 most frequently misarticulated English consonants were written, evaluated, and used with the appropriate portion of the clinic population. Pre- and post-program test scores on measures of articulation, general auditory discrimination, and discrimination of the sounds related to program content were gathered. Results indicate that statistically significant increases were found in both discrimination and articulation as a function of programed discrimination training. The effects of routine use of programed instruction within a more conventional clinical setting are also considered. (AH)

### ABSTRACT 10160

EC 01 0160 ED N.A.
Publ. Date May 67
McDearmon, James R.
**A Method of Teaching Lipreading Using Programmed Learning Principles.**
Alexander Graham Bell Assn. for Deaf, Washington, D. C.
Volta Review, Volume 69, 1967.
EDRS not available

Descriptors: exceptional child education; teaching methods; aurally handicapped; programed instruction; hard of hearing; lipreading; students; B F Skinner

A method of teaching lipreading to hard of hearing students using programed learning principles has been developed. Initially students rely much on memory but depend on it less as lipreading ability increases. The student is first taught 200 short common expressions, then continuous prose using third grade level vocabulary. The teacher first reads words aloud, then without voice. The student repeats aloud each word group. As lipreading ability grows, word groupings gradually become longer. Material is presented aloud less frequently, and fewer reviews are needed. Speed, distance, difficulty of angle, obstruction, distraction, and reading level difficulty are increased. Results show this method can match the task to the student's ability at all levels of advancement. Discouragement is lessened because successful response is made easy. All learnings are strengthened through repeated review. The bibliography contains three items. This article was published in The Volta Review, Volume 69, Number 5, pages 316-318, May 1967. (RS)

### ABSTRACT 10225

EC 01 0225 ED N.A.
Publ. Date Nov 66
Sanford, Adrian B.
**The Learner and the Printed Page--the Place of Graphics in a Learning System.**
Educational Dev. Corp., Palo Alto, Calif.
American Annals of the Deaf, Volume 3, 1966.
EDRS not available

Descriptors: exceptional child education; aurally handicapped; reading; programed instruction; learning; reading skill; textbooks; textbook content; programed materials; programed texts; autoinstructional methods; visual learning; educational change; instructional materials

Learning to read is based on a sequence of (1) experiences with things of the actual world, (2) experiences with reflections of things of the actual world, and (3) experiences with symbols representing those actual things. Because the skill of reading is important in the current educational system and is an intricately involved skill, evidence of the effect of hearing impairment on conceptual growth is necessary. New techniques and materials have been developed. However, teaching must change first. Programing principles should be applied to the preparation of textual materials as a subsystem for learning. Present beginning reading textbooks test children rather than offer them learning experiences because there is no immediate knowledge of results. With programed materials, however, the learner becomes his own teacher. Similar experiences, specially programed, could be of value in educating the deaf. Six references are listed. This article was published in the American Annals of the Deaf, Volume 3, Number 5, pages 626-632, November 1966. (MW)

### ABSTRACT 10316

EC 01 0316 ED 012 992
Publ. Date Apr 67 45p.
Neyhus, Arthur I.
**Self Teaching in the Development of Speechreading in Deaf Children.**
Institute for Language Disorders, Evanston, Illinois
OEG-32-23-0790-5002
EDRS mf,hc

Descriptors: exceptional child research; audiovisual instruction; aurally handicapped; teaching methods; autoinstructional methods; lipreading; deaf; hard of hearing; autoinstructional aids; instructional films; children

The effectiveness of motion picture films as a teaching device in the development of lipreading skills and the use of a cartridge-load, self-winding eight millimeter projector as a teaching tool were studied. It was hypothesized that deaf and hard of hearing children would learn prescribed vocabulary more quickly by autoinstructional film methods than by conventional methods. Eighty-nine deaf or hard of hearing subjects, ages 4 to 10, were divided into four age groups. Deaf subjects had a minimum hearing level of 65 decibels (American Standards Association). Hard of hearing subjects had a maximum hearing level of 64 decibels (American Standards Association). Subjects within each age group were divided into three experimental groups. Group 1 was taught by the films. Group 2 was taught by the teacher and then permitted practice with the films. Group 3 was taught by the teacher only. Results showed no significant difference between the three groups, although Group 1 achieved their maximum scores in the least amount of time. Good lipreaders learned well under all the conditions, while poor lipreaders showed little improvement in any group. The film procedure could be used as a tool for practice and drill, enabling the teacher to devote more of her attention to the slower pupil. A reference list has 30 items. (JB)

### ABSTRACT 10416

EC 01 0416 ED 014 190
Publ. Date Aug 67 165p.
Higgins, Conwell; Rusch, Reuben R.
**Development and Evaluation of Auto-Instructional Programs in Arithmetic for the Educable Mentally Handicapped. Final Report.**
Albany Public Schools, New York
EDRS mf,hc

Descriptors: exceptional child research; mathematics; mentally handicapped; programed instruction; educable mentally handicapped; autoinstructional programs; arithmetic; teaching machines; audiovisual programs; children; experimental programs; program development; program evaluation; program materials; programed units; Audio Visual Manipulative Desk

The purpose of this project was (1) to develop educational media for teaching educable mentally handicapped (EMH) children arithmetic concepts and (2) to evaluate the developed programed instructional materials. During the first phase of the study the activities were devoted toward accomplishing the first purpose, developing the equipment and materials. Several devices and combinations of devices were used during the trial period. The device finally developed, referred to as the audio-visual

manipulative (AVM ) desk, presents information on a screen through the use of a slide projector. Audio messages are transmitted through earphones and a speaker, and the child manipulates objects or writes on the response surface. Twenty-one different sequential arithmetic programs were developed for the desk for teaching EMH children skill sequences in arithmetic. Desk administered tests were also developed to assess the child's understanding of these concepts. Other materials developed include (1) a manual of instructions for teachers (which includes the program objectives) and (2) reinforcement materials for classroom use. During the evaluation phase of the study, four separate field studies were conducted. The results of these studies show that (1) the AVM system was an effective variable in producing differential results, (2) going through programs twice did produce higher posttest scores than going through the programs once, (3) the system could be used effectively in a classroom setting under the supervision of classroom teachers, and (4) programs developed for EMH children were not appropriate for trainable mentally handicapped children. The appendixes include detailed information on the desk and arithmetic programs. Twenty-three references are listed. (AA)

### ABSTRACT 10445

EC 01 0445 ED 015 603
Publ. Date Aug 66 136p.
Karlsen, Bjorn
**Teaching Beginning Reading to Hearing Impaired Children, Using a Visual Method and Teaching Machines. Final Report.**
Minnesota Univ., Minneapolis
OEG-7-33-0400-230
EDRS mf,hc

Descriptors: exceptional child research; reading; programed instruction; aurally handicapped; reading instruction; beginning reading; autoinstructional programs; children; deaf; hard of hearing; programed materials; teaching machines; sequential programs; Stanford Achievement Test; Honeywell University of Minnesota Instructional Device; HUMID

An automated instructional system was developed to teach beginning reading to hearing impaired children using a non-oral method. Instruction was done with visual presentation using 35mm slides on a rear projection screen. This teaching machine, the Honeywell University of Minnesota Instructional Device (HUMID) was constructed with an automatic data recorder and printout device. The first of three studies discovered that instrumentation and programing needed to be improved. Two preliminary studies were conducted. The third study involved one experimental group of 10 first graders and one exceptional group of ten 9 and 10 year olds enrolled in classes for the deaf and hard of hearing. Control groups were matched for IQ, age, sex, hearing, and language performance. Over a period of 35 days, 34 programs were taught to the experimental group. Testing did not reveal any statistically significant differences between the two experimental groups, although the older group performed consistently better than the younger group. On the HUMID posttest, the first graders performed significantly better (at the .01 level) than their control group. The older group also performed better than its control group, although the difference was not statistically significant. On the Stanford Achievement subtests of word meaning and paragraph meaning given to all four groups, only the younger group surpassed their controls at a level which approached significance. There were no statistically significant differences between the older experimental and control groups. Although an automated system of non-oral reading instruction can be developed successfully, it would involve a tremendous amount of programing. The HUMID staff estimated that to bring deaf children from beginning reading to fourth grade reading would require more than 800 programs of 30 to 40 frames each and must also be accompanied by a systematic program of language development. Five studies were carried out within this project by graduate students. The major finding was that data on the response delays has limited usefulness with this method of teaching reading. Programing techniques, content of programs, and information on the technical development of HUMID are presented. A reference list cites 34 items. (MW)

### ABSTRACT 10492

EC 01 0492 ED 013 013
Publ. Date 65 26p.
Garrett, Edgar Ray
**Correction of Functional Misarticulation under an Automated Self-Correction System. Final Report.**
New Mexico State Univ., University Park, Speech Dept.
EDRS mf,hc

Descriptors: exceptional child research; speech therapy; programed instruction; speech handicapped; articulation (speech); auditory training; teaching machines; children; auditory discrimination; speech improvement; Templin Darley Articulation Test

The Automated Speech Correction Program (ASCP ) was designed to test the use of programed instruction in the remediation of functional articulation errors. A series of programed tapes which take the student through auditory identification, auditory discrimination, production, and self-evaluation were designed. Sub-goals of the experiment were a comparison of correcting (representation of a stimulus when subject responded incorrectly) and non-correcting (subject notified of error by a tone) techniques and the effectiveness of personalized subject-therapist correction or no correction between the discrimination phase and the self-correction phase. Subjects were 100 elementary school children with functional misarticulations. Subjects were assigned to varied treatment and control groups. Results indicated (1) ASCP produced improved auditory discrimination and articulation patterns as measured by the Templin Short Test of Sound Discrimination and the Templin Darley Screening Test, (2) the group which received correction of error did not demonstrate a significant difference from those who received the non-correcting presentation, and (3) there is no difference among groups which received or did not receive individualized therapy between the discrimination and self-correction phases. (EB)

### ABSTRACT 10497

EC 01 0497 ED N.A.
Publ. Date Nov 67 47p.
Olton, Robert M. and Others
**The Development of Productive Thinking Skills in Fifth-Grade Children.**
Wisconsin Univ., Madison, Res. Dev. Ctr. Cognitive Learn.
OEC-5-10-154
EDRS mf,hc

Descriptors: exceptional child research; creativity; programed instruction; cognitive processes; creative thinking; grade 5; problem solving; thought processes; autoinstructional programs; classroom environment; intelligence factors; sex differences; instructional materials; programed materials; cognitive tests; testing; skill development

The study investigated the extent to which increments in the thinking and problem solving performance of fifth grade students could be produced by the use of self instructional programed lessons (The Productive Thinking Program, Series One--General Problem Solving) which were designed to teach skills and strategies of creative thinking independent of any specific subject field. All the students in 44 of 47 fifth grade classes in Racine, Wisconsin, Unified School District Number One, participated in the experiment. The 16 programed lessons were administered one per day for 4 days of each week and the teacher's role was held to a minimum. Eight pretests, two internal tests, and 11 posttests of productive thinking were given to all subjects. Results, based on an analysis of test results of a sample of eight males and eight females selected from each class (704 students), showed that The Productive Thinking Program produced statistically significant (p is at least .05) increments in thinking and problem solving performance on 13 out of 40 internal and posttest variables, on measures emphasizing convergent thinking, and on measures dealing with the number and quality of ideas. These instructional benefits occurred for virtually all types of students (regardless of sex or general level of IQ ), and were especially marked for students in classrooms having environments which were judged to provide relatively little support and encouragement for the development of productive thinking. These effects were obtained when the materials were used as an entirely self contained, self instruction program. Considerably greater educational benefits could be expected under conditions where materials are reinforced by

active teacher participation. Quite apart from the effects of the instructional materials, performance on the productive thinking measures used in this study was significantly (p is less than .01) related to sex (girls generally scoring higher than boys) and showed a strong and positive relation to IQ. the appendix contains an example of the programed lessons. Thirty tables of statistics and 14 references are included. (AA/RS)

### ABSTRACT 10557

EC 01 0557 ED 021 353
Publ. Date Aug 65 52p.
**Computer Assisted Instruction for the Mentally Retarded.**
Providence College, Rhode Island
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEC-6-10-165 PC-PROJ-Z-013

Descriptors: exceptional child education; mentally handicapped; programed instruction; autoinstructional aids; computer assisted instruction; teaching machines; computers; teacher workshops; teachers; programing; programing problems; guidelines; teacher role

Computer Assisted Instruction (CAI) for the mentally retarded is described; the advantages of CAI (which generally follows the pattern of programed instruction) are listed; and the roles of the teacher and the student are summarized. The coursewriter is explained, and its use as an experimental tool discussed. Guidelines are given covering objective and demonstration, liaison between instructors, CAI as a tool, the teacher and the computer, and the relationship between the teacher and the program. A synopsis is given of comments by teachers enrolled in the CAI workshop. Samples are provided of three problems involved in computer instruction: analyzing a beginning balance sheet, the electric circuit, and calculating and estimating paper costs. Sample coursewriter sheets, two figures, and a list of teachers participating in the workshop are included. (BW)

### ABSTRACT 10637

EC 01 0637 ED 024 197
Publ. Date Jan 68 357p.
Garrett, Edgar Ray
**Speech and Language Therapy under an Automated Stimulus Control System.**
New Mexico State University, Las Cruces
Office of Education (DHEW), Washington, D. C., Bureau of Education for the Handicapped
EDRS mf,hc
OEC-6-10-198
BR-5-0586

Descriptors: exceptional child research; programed instruction; mentally handicapped; speech therapy; learning disabilities; automation; schematic studies; aphasia; voice disorders; auditory discrimination; stimulus behavior; teaching machines; reinforcement; language handicapped; aural stimuli; articulation (speech); Templin Darley Articulation Test; Automated Stimulus Control System; ASCS

Programed instruction for speech and language therapy, based upon stimulus control programing and presented by a completely automated teaching machine, was evaluated with 32 mentally retarded children, 20 children with language disorders (childhood aphasia), six adult aphasics, and 60 normal elementary school children. Posttesting with the Templin-Darley Articulation Test showed that the Automated Stimulus Control System (ASCS) machine treatment produced non-significant results with mental significantly improved discrimination and articulation with those receiving pure tone only reinforcement (p less than .05). ASCS machine treatment produced significant changes with child aphasics (p less than .01). Following treatment, these subjects also showed improvement on the Peabody Picture Vocabulary Test, the Illinois Test of Psycholinguistic Abilities, and on word list performance. Both ASCS machine treatment and ASCS clinician-presented treatment produced significantly improved articulation with normal elementary school children (p less than .001). Adult aphasics showed no significant change, nor did retardates receiving traditonal therapy. Results indicated that significant changes in functional articulation programs occurred in 20% of the time usually required by traditional therapies. (Author/SN)

### ABSTRACT 10701

EC 01 0701 ED N.A.
Publ. Date Apr 67 7p.
Swack, Myron J.
**Training Special Education Teachers in Physical Therapy Techniques by Means of Programed Demonstrations.**
Eastern Michigan University, Ypsilanti
EDRS not available
Exceptional Children; V33 N8 P529-35 Apr 1967
Article Based on the Author's Doctoral Dissertation, The University of Michigan.

Descriptors: exceptional child research; physically handicapped; programed instruction; teacher education; physical therapy; orthopedically handicapped; student teachers; prostheses

A study was designed to evaluate a method for coordinating efforts of the physical therapist and the orthopedic classroom teacher in two areas: inspection of therapeutic equipment amd methods of facilitating locomotion. The method consisted of programed demonstrations and forced choice discrimination tasks given to 20 student teachers in two groups. One group received instruction in methods of inspection and adjustment of therapeutic equipment. The other group received instruction in facilitation of locomotion of physically handicapped children. Observers evaluated both groups on classroom use of the instruction. The inspection group had a significantly higher (p equals .05) incidence of inspecting and adjusting behavior than did the locomotion group which did not receive this type of training. The methods of locomotion program did not produce the expected changes in the classroom. However, there was a significant difference in behavior between the two groups of training. (SB)

### ABSTRACT 10754

EC 01 0754 ED 025 046
Publ. Date (66) 179p.
Platt, Henry and Others
**Automation in Vocational Training of the Mentally Retarded. Final Report.**
Devereux Foundation Institute for Research and Training, Devon, Pennsylvania
Vocational Rehabilitation Administration (DHEW), Washington, D. C.
EDRS mf,hc
VRA-R-993-P-63

Descriptors: exceptional child research; mentally handicapped; emotionally disturbed; programed instruction; vocational education; autoinstructional aids; autoinstructional methods; job skills; audiovisual instruction; teaching methods; instructional materials; autoinstructional programs; instructional technology; educable mentally handicapped; teaching machines; vocational training centers; learning; homemaking skills; Graflex Audio Graphic Instructor; Car Tap Unit; Auditory Visual Kinesthetic Unit; Devereux Model 50 Teaching Aid; Learn Ease Teaching Device; Mast Teaching Machine

Various uses of automation in teaching were studied with mentally retarded (IQ 70 to 90) and/or emotionally disturbed (IQ 80 to 90) youth aged 16 to 20. Programed instruction was presented by six audiovisual devices and techniques: the Devereux Model 50 Teaching Aid, the Learn-Ease Teaching Device; the Mast Teaching Machine, the Graflex Audio-Graphic Instructor, the Car Tap Unit, and the A-V-K (Auditory-Visual-Kinesthetic) Unit. Several preliminary field tests were conducted which involved the development of skills in work related areas; another study involved measurement in the kitchen. Later field testing employed units on job responsibilities, tool recognition, telephone use, and home nursing. Data analysis indicated that the automated method was usually more efficient than the conventional and programed lectured methods; the method integrating conventional and automated instruction was most effective; the machine method alone was least effective; autoinstructional aids decreased the amount of time needed to learn; autoinstructional aids produced greater retention; and autoinstructional aids produced group gains, but individual gains varied considerably within each group. (JD)

### ABSTRACT 10766

EC 01 0766 ED 025 052
Publ. Date Aug 67 75p.
Malpass, Leslie F.
**Further Development, Comparison and Evaluation of Programed Instruction for Retarded Children. Final**

**Report.**
University of South Florida, Tampa
Office of Education (DHEW), Washington, D. C., Bureau of Research
EDRS mf,hc
OEG-7-19-0315-291
BR-5-0667

Descriptors: exceptional child research; mentally handicapped; reading; programed instruction; educable mentally handicapped; public schools; special classes; institutional schools; reading instruction; spelling; spelling instruction; reading improvement; retention; achievement gains; programed materials; programed texts; teaching machines; autoinstructional methods; conventional instruction

Three hundred words were programed for presentation by teaching machine or by workbook to mentally handicapped, nonreading subjects selected from the public school system (69 subjects) and from an institution (30 subjects). Both groups were matched on chronological age, mental age, programed words known, Gray Oral Reading Test (raw score) and a paragraph reading test score. One group received instruction by teaching machine, one by programed workbook, and one by conventional classroom methods. Administration required approximately 20 hours over a 5-month period. Measures of gain and retention included programed words known, the Gray Oral Reading Test, spelling words known, and a paragraph reading test administered post-instruction and at 30- and 60-day intervals. Statistical analysis revealed both the institutional and public school groups scored significantly higher than the classroom group on the measures of programed words learned (p equals .05 and .01 respectively) and on the paragraph reading test (p equals .01 for both). Retention remained significantly high (p equals .01) for the public school group but was not demonstrated for the institutional group. The technique was not effective for teaching spelling and in most cases scores on the Gray Oral Reading Test were not significantly different among the groups. (Author/RS)

## ABSTRACT 10816

EC 01 0816 ED 025 087
Publ. Date Sep 68 24p.
Seitz, Sue; Goulding, Peggy
**An Investigation of Factors Influencing Learning in the Mentally Retarded, and their Use in the Design of Instructional Materials; Training Procedures and Automation: Effects on MR Performances. Interim Report.**
Austin State School, Texas
Office of Education (DHEW), Washington, D. C., Bureau of Research
EDRS mf,hc
OEG-0-8-070185-1750
BR-7-0185

Descriptors: exceptional child research; mentally handicapped; learning; programed instruction; reinforcement; discrimination learning; positive reinforcement; automation; teaching machines; memory; recall (psychological); retention; response mode; cues; prompting; recognition; motivation; motivation techniques; verbal learning; nonverbal learning

The effects of prompting and confirmation on automated presentation of materials in discrimination learning were studied. Eight pairs of words or pictures were presented to 48 mentally retarded subjects (mean IQ 63, mean chronological age 163.4 months, mean mental age 103.3 months). Each subject's correct responses advanced the program and, in the prompting condition, the correct response was always underlined. The number of errors in the original learning was less under prompting (p less than .001). Treatment by order interaction was also significant (p less than .01) with better performance for prompting from word-picture order and for confirmation form picture-word order. Seven days later, prompting subjects committed fewer errors in relearning (p less than .001) and were superior in recognition (p less than .01). Confirmation was further tested under two new conditions: in one, praise and candy reinforced all correct responses; in the other, they were given only upon correct first choices during practice trials. The first group had fewer errors (p less than .01) than the second or those in the analogous condition in the earlier experiment; and performance in the second experiment was not significantly different from that seen in prompting. (JD)

## ABSTRACT 10848

EC 01 0848 ED 003 063
Publ. Date 63 104p.
Malpass, Leslie F.
**Comparison of Two Automated Teaching Procedures for Retarded Children.**
University of South Florida, Tampa
EDRS mf,hc
CRP-1267

Descriptors: exceptional child research; mentally handicapped; language arts; reading; programed instruction; teaching methods; instructional technology; public schools; adolescents; conventional instruction; autoinstructional aids; teaching machines; program evaluation; educable mentally handicapped; children; slow learners; mental retardation; word recognition; spelling; reading ability; Gates Word Recognition Test; Stanford Binet Intelligence Scale

A study was designed to evaluate the usefulness of automated teaching procedures for helping mentally retarded children learn word recognition, reading, and spelling. The 66 subjects for the study were drawn from established public school classes for the educable mentally retarded. Subjects, ranging in age from 8 to 16 years, were matched and assigned randomly to either an automated teaching group or a conventional classroom group. Three hypotheses were tested: there will be no differences between automated teaching and standard instruction for teaching selected tasks; effective retention of skills, taught through automated means, will be demonstrated by post-learning tasks; and no significant differences will be found between an automated procedure utilizing a multiple choice method and one utilizing a typewriter keyboard method. Hypothesis 1 was rejected in light of significant skill improvement by subjects using both automated teaching procedures over conventional methods. Hypothesis 2 was partially supported in that spelling improvement was retained over a relatively short period. Hypothesis 3 was partially supported. In view of the findings, further research concerning automated teaching with the retarded was recommended. (JC)

## ABSTRACT 10853

EC 01 0853 ED 014 193
Publ. Date Mar 67 85p.
Mallinson, George G.
**Programmed Learning Materials for the Blind.**
Western Michigan University, Kalamazoo
EDRS mf,hc
OEG-7-0580-191

Descriptors: exceptional child research; programed instruction; visually handicapped; sciences; braille; blind; science education; adolescents; instructional materials; junior high school students; learning processes; programed materials; science instruction; science materials; science programs; stimulus devices

Designed as a preliminary investigation to determine the feasibility of using programed learning materials with blind students, this study developed four types of stimulus-response modes for programed instruction: audio stimulus-audio response, audio stimulus-braille response, braille stimulus-audio response, and braille stimulus-braille response. A pilot testing program revealed the braille stimulus-braille response mode was most appropriate. Tests determined that the most efficient braille stimulus-braille response format was a booklet in which the braille frame appeared on one page and the correct response on the next. The student responded with a braille writer or braille slate and stylus. Commercially developed programs for junior high school science were modified for use with blind students. Two 50-frame programs reproduced in braille were tested with 57 blind junior high school students. Results showed they could handle these programed materials in a reasonable amount of time and with a high degree of accuracy. Instructions were followed with minimal difficulty. Performance improved with second book. In modifying the program for use with the blind, 32 symbols were developed for the most frequently used science terms in order to reduce the bulk of braille materials. To determine whether blind students could discriminate among the symbols and between the symbols and braille, 43 blind students (grades 6 to 10) were given tests in the form of checkers and checkerboards which contained the various special science symbols. Student scores improved as IQ

rose, junior high students scored better than sixth graders. high school students reacted negatively and did not do well. On second trials students required less time and scored fewer errors. The appendixes contain sample science programs on physical and chemical changes, symbols and formulas, and the plastids. (TM)

### ABSTRACT 10884

EC 01 0884 ED 014 161
Publ. Date May 66 70p.
Eldred, Donald M.
**The Use of Programmed Instruction with Disturbed Students.**
Vermont State Hospital, Waterbury
EDRS mf,hc

Descriptors: exceptional child research; programed instruction; emotionally disturbed; slow learners; underachievers; programed materials; children; adolescents; hospital schools; public schools; test results; high school students

A 3-year investigation was undertaken to determine the effects of programed instruction on children and adolescents. The 157 subjects were pupils from a state mental hospital school and slow learners and underachievers in one parochial and two public high schools. Although not available for all subjects, results of the Rorschach Test, the Gittinger Personality Assessment System, and psychiatric ratings were used. None of the objective measures revealed any significant differences between the control and the experimental groups. Possible reasons for lack of significant data are discussed and recommendations and precautions for future research studies are made. Thirty pages of administrator, teacher, and student comments and evaluations are presented. The appendix includes general instructions for the use of programed instruction, an annotated listing of 20 programed materials, and a 74-item bibliography. (JA)

### ABSTRACT 11029

EC 01 1029 ED N.A.
Publ. Date Dec 67 6p.
Haskell, Simon H.
**Impairment of Arithmetic Skills in Cerebral Palsied Children and a Programed Remedial Approach.**
London University, England
Spastics Society, England
EDRS not available
Journal of Special Education; V1 N4 P419-24 Dec 1967

Descriptors: exceptional child research; physically handicapped; cerebral palsy; mathematical concepts; arithmetic; learning disabilities; perceptual motor learning; emotional problems; attention span; programed instruction; research reviews (publications)

Studies focusing on the cerebral palsied (CP) child's problems in learning arithmetic skills which suggest that several factors specific to the disability affect arithmetic attainment are reviewed. These factors include lack of sensorimotor experience, higher incidence of ocular defects, disorders in perception, disturbances in visuomotor skills, distractability, perseveration, difficulty in generalizing, and higher incidence of emotional disturbance. Advantages of programed instruction discussed are that it lessens learning time, increases length of information retention, and betters understanding of subject matter. The author's study is cited in which 21 CP children, aged 9 to 16 years, received a 13-week course of programed instruction covering four basic arithmetic rules while a matched group of similarly handicapped children was taught by conventional methods. Results reported are that both groups showed improvement, programed instruction was equal to the conventional method, and the most handicapped benefited the most from the programed instruction. Refinement of the programed instruction course, with more series of stages, is recommended. (SB)

### ABSTRACT 11033

EC 01 1033 ED N.A.
Publ. Date Nov 67 6p.
Rainey, Dan S.; Kelly, Francis J.
**An Evaluation of a Programed Textbook with Educable Mentally Retarded Children.**
Southern Illinois University, Carbondale
EDRS not available
Exceptional Children; V34 N3 P169-74 Nov 1967

Descriptors: exceptional child research; mentally handicapped; mathematics; teaching methods; programed instruction; achievement; educable mentally handicapped; rote learning; number concepts; division; multiplication; small group instruction; reinforcement; failure factors; teaching machines; reading achievement; sex differences; visual learning

Educable mentally handicapped children in public school special classes (mean IQ 65, mean chronological age 14) participated in a study to evaluate three arithmetic teaching methods: 20 received the TMI Grolier Multiplication and Division Facts Program; 26, a teacher made program using the rote approach; and 36, a teacher made program using the understanding approach. Each group received arithmetic instruction 1 hour daily for 4 weeks. A multivariate analysis of variance was used to assess the relative effectiveness of the several treatments. Results for three groups of females indicate that for those with reading grade scores above 2.3, the programed instruction was more effective than rote or understanding procedures (p less than .02). The understanding group showed a negative relationship between reading level and posttest arithmetic reasoning scores while the rote group scored significantly higher in division (p less than .00005). No treatment differences were found for multiplication. (AP)

### ABSTRACT 11073

EC 01 1073 ED 023 229
Publ. Date 14 Oct 64 15p.
Kederis, Cleves J. and Others
**Training for Increasing Braille Reading Rates. Final Report.**
American Printing House for the Blind, Louisville, Kentucky
Vocational Rehabilitation Administration (DHEW), Washington, D. C.
EDRS mf,hc
VRA-RD-1086S-63

Descriptors: exceptional child research; visually handicapped; reading; braille; motivation; tachistoscopes; reading speed; reading comprehension; pacing; reading tests; teaching machines; test results; positive reinforcement

Two studies used controlled exposure devices in attempts to improve braille reading. The three null hypotheses tested were that reading practice under controlled exposure does not increase reading rates, any increase will not be maintained, and no differences in comprehension occur because of practice. Subjects were selected by the Gates Basic Reading Test and randomly assigned to experimental and control groups. The first group of three subjects in grades 6 to 12 was divided into fast, average, and slow readers at each of three grade levels, while the second study chose the 16 highest and 16 lowest scorers. The first study trained the experimental subjects in 22 half-hour sessions on consecutive days with the tachistotactometer, and reading test forms were administered one month prior to training, immediately following training, and 1 to 2 months after training. In the second study, experimental subjects practiced paced reading (with attempted increases of two and one-half words per minute each day) for 20 half-hour sessions on consecutive days, using two books with vocabulary grade levels 5 to 9 and 7 to adult on the IBM Braille Reading Machine. The null hypotheses were confirmed in both studies. Significant reduction in reading time occurred on the motivated tests in both studies (p less than .001 and p less than .01 respectively) in all the experimental and control groups. (DF)

### ABSTRACT 11167

EC 01 1167 ED 016 401
Publ. Date Jul 63 48p.
Bivens, Lyle W. and Others
**Self-Direction in Programed Instruction: Effects on Learning in Low-Ability Students.**
American Institute for Research, Palo Alto, California
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEG-7-48-0000-183 AIR-D10-7/63-TR
American Institute for Research, Station A. P. O., Box 11487, Palo Alto, California 94306.

Descriptors: exceptional child research; mathematics; programed instruction; learning; junior high school students; low achievers; retention; mathematical concepts; set theory; programing; linear programing; sequential programs; branching; learning motivation

The effects of self direction and self evaluation on the learning and retention of mathematical topics were assessed. Subjects were 41 general mathematics students considered to represent the

lower half of the mathematical achievement distribution for ninth grade students. Two learning programs were used, one on permutations and combinations and one on set theory. Both were modified into a linear and a self-directed form. Assessment was provided by means of questionnaires and criterion tests. Analysis of variance revealed no significant effect of teaching method, no significant method-by-lesson interaction, and no systematic effect on retention. Total time spent by the two groups in studying and taking tests was virtually identical, although the self-directed group spent 8% less time studying. The results of the questionnaire indicated a preference, especially among the poorer students, for linear methods. Findings suggest that linear programing reduces or eliminates the dependence of learning upon ability except when the learning method demands relatively rapid assimilation of new knowledge. The questionnaire, responses to it, and the criterion tests are appended. (MK)

### ABSTRACT 11169

EC 01 1169 ED 003 150
Publ. Date 13 Aug 65 116p.
Homme, Lloyd E.
**A Demonstration of the Use of Self-Instructional and Other Teaching Techniques for Remedial Instruction of Low-Achieving Adolescents in Reading and Mathematics. Final Report.**
TMI Institute, Albuquerque, New Mexico
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEC-4-16-033 NDEA-VIIB-487

Descriptors: exceptional child research; instructional materials; reading; mathematics; programed instruction; teaching methods; academic performance; achievement gains; motivation; low achievers; adolescents; demonstration programs; remedial instruction; autoinstructional aids

A demonstration project was conducted to develop and test a system of instructional materials intended to provide remedial instruction in reading and mathematics for low achieving adolescents; to determine the effects of such a system on retention and job performance over a 6-month period; to revise the system and prepare an instructor's utilization manual for its use, and field test it under conditions of use, both within and outside the conventional school setting; to make final recommendations concerning the development and use of instructional material intended for the school dropout or potential dropout; and to revise the utilization manual on the basis of the field testing. The project was conducted in four phases: teaching, record keeping, field testing, and data collection and analysis. Results sufficiently confirmed project expectations, and further applications were recommended. The system appeared to provide the positive atmosphere for low achievers necessary to produce motivation for the pursuit of academic goals. Research was recommended in two directions: further refinement of administrative techniques to reduce unfavorable teacher and student attitudes, and further research into components of the system itself. The instructor's utilization manual is included. (HB)

### ABSTRACT 11230

EC 01 1230 ED 003 177
Publ. Date Jul 62 119p.
Silverman, Harry and Others
**Development and Evaluation of Self Instructional Materials for Underachieving and Overachieving Students.**
Systems Development Corporation, Santa Monica, California
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEG-704137-01 NDEA-VIIA-671
TM-727

Descriptors: exceptional child research; achievement; mathematics; instructional materials; programed instruction; teaching methods; instructional technology; learning characteristics; autoinstructional aids; achievement; secondary school mathematics; overachievers; low achievers; learning; underachievers; geometry

The interaction between programed teaching devices and individual characteristics of high school students was explored. There were four steps: preparation of materials on geometry, the establishment of criterion measures, preliminary pilot experiments, and the main experiment. The main experiment was performed in 27 classes in three high schools. The variables tested were achievement characteristics (over-, normal-, and underachievers) of approximately 250 students, and the rote and conceptual forms of the program. The conclusions were as follow: the dimensions for specifying the learning task, method, and student have not been identified; a period of informal hypothesis development should precede formal experiments; and the potential advantages of programed instruction, particularly of highly responsive programed instruction, are not effective at the secondary school level. Attempts to keep methods within the programed instruction framework have impaired the effectiveness of the instruction. Future research was suggested to determine the effective combination of instructional techniques and methods for specified tasks and for students of specified characteristics. (RS)

### ABSTRACT 11272

EC 01 1272 ED N.A.
Publ. Date Mar 68 214p.
Pickett, J. M., Ed.
**Proceedings of the Conference on Speech-Analyzing Aids for the Deaf (Gallaudet College, Washington, D.C., June 14-17, 1967).**
Gallaudet College, Washington, D. C., Graduate School
EDRS not available
American Annals of the Deaf; V113 N2 P116-330 Mar 1968

Descriptors: exceptional child research; aurally handicapped; speech handicapped; conference reports; deaf; hard of hearing; speech; automation; speech therapy; programed instruction; auditory discrimination; sensory aids; hearing aids; electromechanical aids; hearing loss; speech pathology; visible speech; lipreading; auditory tests

Twenty-three conference papers and two discussions explore current work in speech science, phonetics, and automated training. Technical aids for training children, visual aids for speech correction, and correction of voice pitch in severely hard of hearing children are considered. Papers on speech-analyzing aids treat the Bell Translator, eyeglass speech reading, the voice visualizer, the Arthur D. Little phoneme analyzer, an experimental visual speech trainer, an instrument that creates artificial speech spectra, a frequency shift hearing aid, and visual and vibrotactile aids. Other studies explore monosyllabic production by deaf and dysarthric speakers, fundamentals of speech analysis and synthesis hearing capacity, measurement and calculation, synthetic speech in aural rehabilitation, programed instruction, discrimination, frequency transposition, residual hearing, and auditory recoding. (JB)

### ABSTRACT 11299

EC 01 1299 ED 024 201
Publ. Date 30 Nov 67 50p.
Leutenegger, Ralph R.
**Automated Training in Auditory Perception and Phonetic Transcription for Beginning Students in Speech Pathology and Audiology. Final Report.**
Wisconsin University, Milwaukee
Office of Education (DHEW), Washington, D. C., Bureau of Research
EDRS mf,hc
OEG-5-1003-4-11-3
BR-5-1003

Descriptors: exceptional child research; professional education; programed instruction; perception; teaching methods; speech phonetics; feedback; language laboratories; automation; aural stimuli; auditory perception; auditory discrimination; auditory training; speech therapists; student teacher relationship; Language Master

The phonetic transcription ability of 78 college students whose transcription instruction was administered by means of pre-programed Language Master cards was compared with that of 81 students whose instruction was non-automated. Ability was measured by seven weekly tests. There was no significant relationship on any of 29 variables with type of instruction. Intercorrelational techniques showed no positive correlation for sex, but positive correlations of grade point average and transcription and theory tests, and in four of the six Seashore Measures of Musical Abilities subtests (timbre, memory, pitch, and time). On questionnaires, students with live instruction indicated that they were significantly more satisfied (p equals .05) and the main reason given was the feedback obtained from verbal imitation and the

instructor's immediate critical reaction. It was concluded that live instruction be supplemented by machine practice. Three references are cited: word lists, instructions for Language Master users, satisfaction scale, grade data, and questionnaire data are provided. (Author/SN)

### ABSTRACT 11616

EC 01 1616 ED N.A.
Publ. Date Sep 64 3p.
Rush, Mary Lou
**Programmed Instruction for the Language of Directions.**
EDRS not available
American Annals of the Deaf; V109 N4 P356-8 Sept 1964

Descriptors: exceptional child research; aurally handicapped; programed instruction; language; test construction; intermediate grades; tests; language tests; teaching methods

A test was constructed to be used as a guide in the development of a program to aid deaf children in following test directions. Content was kept as simple and elementary as possible so that the directions could be effectively evaluated. Subjects were 57 deaf children (ages 10-10 to 18-9, grades 4 to 7); all had reading scores from grade 2.1 to 5.1. Test results were used to develop a 331- frame self-administered linear program to teach the language of directions. Prior to program administration, 24 of the children were given a retest to measure practice effect; the difference was significant at the .01 level of confidence. The program was then administered and the original test was administered as posttest. Results indicated that the mean gain for the posttest was three times that of the mean gain from the practice effect of the test-retest. Of the 33 children who did not take the retest, 79% attained scores higher than the practice effect differential. Analysis of responses showed that younger children with lower reading scores made more errors than children with more school experience and higher reading scores, but the score differentials and number of errors were not statistically significant. (SN)

### ABSTRACT 11617

EC 01 1617 ED N.A.
Publ. Date Mar 63 4p.
Fessant, John M.
**Application of Programmed Learning for Deaf Children to Industrial Arts.**
EDRS not available
American Annals of the Deaf; V108 N2 P241-4 Mar 1963

Descriptors: exceptional child education; aurally handicapped; programed instruction; teaching methods; audiovisual instruction; deaf; school shops; individual instruction; industrial arts; teaching machines

As participants in a pilot project to teach technical vocabulary to shop classes, deaf students constructed the simple machine which would present the program, a rectangular box with spindles inside to hold question and answer tapes which were observed through windows in the top. The student read the question, wrote his answer in a space provided, then rolled the tape to see the correct answer. A program was devised to teach the construction principles and operating mechanisms of the machine; the material was repeated several times in different ways to insure learning. A marked increase in student interest and motivation was noted. Advantages included more individual instruction, opportunity for students to make up missed work, and time free from lecturing for the instructor to assist individuals. Illustrated plans for constructing the teaching machine are appended. (JB)

### ABSTRACT 11662

EC 01 1662 ED 003 176
Publ. Date 29 Feb 68 370p.
Blackman, Leonard S. and Others
**The Development and Evaluation of a Curriculum for Educable Mental Retardates Utilizing Self-Instructor Devices for Teaching Machines.**
Edward R. Johnstone Training and Research Center
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEG-7-28-073 NDEA-VII A-368

Descriptors: exceptional child research; mentally handicapped; curriculum; programed instruction; programed materials; instructional technology; skill development; adolescents; autoinstructional aids; curriculum development; curriculum evaluation; educable mentally handicapped; program evaluation; instructional programs; teaching machines

An evaluation of self instructional devices in the classroom and the related psychological research is presented. Part 1 covers phases of machine and program development, a review of relevant literature, and the major experiment. Educable mentally retarded 14-year-olds were selected and divided into two groups. The experimental group consisted of 19 persons and the control group of 17. Both groups were tested at the beginning and end of the year. The experimental group received programed instruction, and the control group was taught conventionally. Analysis of the data showed negative results in the effectiveness of machine instruction skill development with the exception of one arithmetic measure. Further research was encouraged to study the psychological properties of school tasks. Part 2 includes theoretical statements and literature surveys. (RS)

### ABSTRACT 11715

EC 01 1715 ED N.A.
Publ. Date Nov 66 4p.
Postlethwait, S. N.
**A Multi-Faceted Approach to Teaching.**
EDRS not available
American Annals of the Deaf; V111 N5 P657-60 Nov 1966

Descriptors: exceptional child education; teaching methods; curriculum; aurally handicapped; sciences; college science; plant science; science instruction; botany; autoinstructional methods; individual instruction; college freshmen; audiovisual aids

An audio-tutorial approach to botany which could be adapted for use with handicapped persons is described. The course involves three study sessions, two of which are scheduled. The sessions include a General Assembly Session (GAS), an Integrated Quiz Session (IQS), and an Independent Study Session (ISS). The GAS is under the supervision of the senior course instructor, meets for 1 hour a week, and consists of lectures. The IQS involves eight students on a scheduled basis for a 30-minute quiz period. The ISS is unscheduled, conducted in a learning center, and involves the use of booths. Each booth contains a tape player, a movie projector, specimens, microscope, slides, experimental equipment, and other materials needed for the weekly lesson. Results indicate an improvement in performance of persons taking the course using this approach. The utilization of this technique with the deaf and hard of hearing, use of audiotape to amplify material, the exploitation by the ISS of all sense modalities, and the ability of the teacher to structure such activities as repetition, association, and concentration are considered. Additional features mentioned are a one-to-one student-teacher ratio and individualized instruction in which the student progresses in small logical sequential learning steps. (EB)

### ABSTRACT 11739

EC 01 1739 ED N.A.
Publ. Date 68 4p.
**Computers Are for Teaching.**
New York League for the Hard of Hearing, New York
EDRS not available
New York League for the Hard of Hearing, 71 West 23rd Street, New York, New York 10010.
From Highlights, Fall 1968.

Descriptors: exceptional child education; aurally handicapped; programed instruction; teaching machines; computer assisted instruction; reading instruction; multisensory learning; Edison Responsive Environment

An experimental program for hearing handicapped students with a computer based, multi-sensory teaching machine is described. The edison Responsive Environment, or the Talking Typewriter, is re-designed for this program to accomodate a special sound amplification system which provides visual, auditory and tactile sensory modes through a computer controlled network of 35 mm slides and voiced instructions. Stress is placed on simplified verbal portions of the programed material and visual content. The long-term aim, to reduce instruction time in teaching reading in order to give hearing and speech clinicians more time for individual therapy with instructional material specifically designed for hearing impaired students, is presented. (GD)

## ABSTRACT 12008

EC 01 2008 ED 010 107
Publ. Date Dec 65 299p.
Stepp, Robert E.
**A Feasibility Study to Investigate the Instrumentation, Establishment, and Operation of a Learning Laboratory for Hard-of-Hearing Children. Final Report.**
Nebraska University, Lincoln, Extension Division
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEC-3-16-044 NDEA-VIIB-404
BR-5-1356

Descriptors: exceptional child research; aurally handicapped; programed instruction; lipreading; audiovisual instruction; repetitive film showings; learning laboratories; evaluation; student teacher relationship; instructional films; audiovisual aids

Ten deaf and hard of hearing children, aged 5 to 8, were selected to test a self-instructional, self-operating system to develop lipreading skills. The system consisted of three study carrels, an 8-mm cartridge-loading sound motion picture projector, and an observation booth utilizing a one-way mirror. Twenty-five sound and color films stressing single-word, associated-word, and multiple-word instructional patterns, and a series of film tests to measure ability to lipread the vocabulary presented were produced. Each instructional pattern contained presentation, review, and response elements. The system was evaluated through student case histories consisting of nearly 1,000 observations. A second evaluation technique consisted of periodic filming of the reactions of the student while viewing the film and using it to produce a 16-mm split-frame production for studying the stimulus (teacher) and the response (student). The results showed that it is possible to establish a teacher rapport similar to that which currently exists in face-to-face teaching. (HS)

## ABSTRACT 12075

EC 01 2075 ED 010 766
Publ. Date 65 69p.
Sands, Theodore; Hicklin, Charles R.
**The Development and Testing of Instructional Materials for Gifted Primary Pupils. Final Report.**
Illinois State University, Normal
Illinois Office of Superintendent of Public Instruction, Normal
EDRS mf,hc

Descriptors: exceptional child research; gifted; programed instruction; sciences; instructional materials; elementary school students; elementary school science; parent attitudes; audiovisual instruction; mathematics; education; physical sciences; student evaluation

Self-instructional science materials for gifted primary students were developed and used with first- and second-grade students. Units on atomic structure, the nature of molecules, measurement, and mathematics were developed, used, evaluated, and revised over a 2-year period. Lessons were presented through the use of tape players, illustrative materials, and workbooks. Students were selected on the basis of IQ scores and assigned to two groups. Each group used the materials for one-half of the experimental period. All students were pretested, tested at the end of the fourth week, and post-tested for achievement with instruments developed for the study. Other data were obtained from teacher evaluation forms and questionnaires completed by teachers and parents. Significant gains, at the .05 level, were obtained for the units concerned with mathematics, atoms, and measurement. A majority of the parents favored the use of the materials and indicated that the children developed interest through their studies. (AG)

## ABSTRACT 20040

EC 02 0040 ED 003 579
Publ. Date 62 85p.
Smith, Wendell I.; Moore, J. William
**Programed Materials in Mathematics for Superior Students in Rural Schools.**
Bucknell University, Lewisburg, Pennsylvania
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEG-736101 NDEA-VIIA-489

Descriptors: exceptional child research; gifted; mathematics; teaching methods; programed instruction; mathematics instruction; teaching machines; rural schools; programed texts; autoinstructional programs; modern mathematics; student seminars; instructional technology; programed materials; high school students; rural education

A study was conducted on the achievements of superior students who used programed instruction and seminars in modern mathematics. Two experiments were conducted to test the hypotheses that superior students using programed instruction will achieve higher scores than those using conventional materials, students using programed instruction by machine will not differ from those using a programed textbook, and students will not show a preference between the two modes of programed instruction. Four groups were established for the basic experiment. The sample consisted of 100 high school students who were randomly assigned to the machine, programed textbook, conventional textbook, or control groups. The results indicated that self-instructional materials in mathematics can be used profitably by superior students with or without a teacher. (RS)

## ABSTRACT 20121

EC 02 0121 ED N.A.
Publ. Date Sep 65 4p.
Bradley, Betty Hunt; Hundziak, Marcel
**TMI-Grolier Time Telling Program for the Mentally Retarded.**
EDRS not available
Exceptional Children; V32 N1 P17-20 Sept 1965

Descriptors: exceptional child research; mentally handicapped; teaching methods; programed instruction; educable mentally handicapped; testing; teaching machines; reinforcement; practical mathematics; TMI Grolier Time Telling Program

The TMI-Grolier Time Telling Program, published for normal children, was administered to mentally retarded subjects to ascertain possible application of the procedures. Subjects were 15 residents of a state school with mean IQ of 56 and a mean age of 16.5 years; they were able to count and to read simple words. Twelve clocks in the program, consisting of 440 frames of clocks and numbered scales to aid the subject in visually discriminating the long and the short hands, were presented to the subjects on a Min-Max II desk model machine by a psychologist and teacher. Each subject required a total time of 2 hours or less. Test results indicated gain scores significant at the .005 level. Little relationship was evident between gain scores and achievement or IQ. However, perceptual disability may have influenced performance. Findings were that mentally retarded children could profit from a teaching machine program written for normal children, and reinforcement in addition to that provided by the machines was necessary. The major benefit of employing the machines seemed to be the rapid determination of learning difficulties. (CG)

## ABSTRACT 20221

EC 02 0221 ED N.A.
Publ. Date Feb 67 5p.
Edwards, Allan E.
**Experimental Testing Program for Teaching Aphasics.**
National Clearinghouse for Mental Health Information, Chevy Chase, Maryland;
National Institute of Mental Health, Bethesda, Maryland
Public Health Service (DHEW), Washington, D. C.
EDRS not available
Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402 ($1.00).
From Mental Health Program Reports, No. 1568, P. 159-63, A Public Health Service Publication.

Descriptors: exceptional child research; aphasia; testing; language handicapped; visual perception; visual discrimination; programed materials; teaching machines

To determine whether the language loss sustained by the aphasic is an impaired ability to make perceptual discriminations, over 100 patients (ages 51 to 79) having varying degrees of neurological damage were matched with persons showing no brain damage. Subjects were tested for visual discrimination of geometric shapes by teaching machine techniques. The aphasics made many more errors and took longer to respond than the controls. However, on a test 10 days later, the aphasics showed signs of retention and nearly 100% improvement over the first performance. Twenty-four aphasics were then selected for three training sessions in visual discrimination;

results indicated that subjects receiving training where they needed it improved most, that all dropped considerably in latency, and that all responded more rapidly on a following test after a week. A description is provided of the teaching machine used. (DF)

### ABSTRACT 20329

EC 02 0329 ED N.A.
Publ. Date Feb 68 118p.
**Conference Report; Responsive Environment Learning Centers: Feedback from the Field.**
Responsive Environments Corporation, Englewood Cliffs, New Jersey
EDRS not available
Responsive Environments Corporation, Englewood Cliffs, New Jersey 07632.

Descriptors: exceptional child education; teaching methods; audiovisual aids; educational technology; programed instruction; typewriting; autism; mentally handicapped; reading instruction; case studies (education); learning activities; Edison Responsive Environments

A meeting of educators utilizing Responsive Environment Learning Centers includes speeches and discussions on Edison Responsive Environments (ERE--the talking typewiter). Topics treated are the following: a panel program on beginning and remedial language arts; ERE as a research instrument in programing; the relationship of ERE to the education profession; the response of teenagers to remedial programs; the role of the public aid agency in ERE programs; and project implementation. A speech by Marshall McLuhan focuses on the human sense, the environment, and technological change. Exceptional learners, a panel discussion, and these subjects are also presented: childhood autism, adaptation of the phonovisual method for the ERE, use of the ERE in England, use of the ERE with the retarded, future plans, comments on psychological development by J. McVicker Hunt, and closing remarks. (RJ)

### ABSTRACT 20355

EC 02 0355 ED N.A.
Publ. Date Jun 67 7p.
Johnson, Gordon F.
**Innovations in Programed Instruction.**
California Federation, Council for Exceptional Children, Santa Ana
EDRS not available
Journal; V16 N3 P3-9 Jun 1967

Descriptors: exceptional child research; programed instruction; teaching methods; mentally handicapped; learning theories; reinforcement; operant conditioning; research projects; educational benefits; research needs; mental illness; classroom research; research and development centers; research reviews (publications)

In a discussion concerning the development of effective teaching techniques for special education, B.F. Skinner's and other programers' theories and research about reinforcement and conditioning position are outlined. The successful conditioning of a mental patient is reviewed, and six recent studies in programed instruction are summarized. Individual programing and operant techniques used with mental retardates and their success are explained. Also listed are the implications and possible advantages of programing for education, classroom research, and regional research centers. A bibliography cites 11 items. (JA)

### ABSTRACT 20502

EC 02 0502 ED N.A.
Publ. Date Oct 69 13p.
Flanigan, Patrick J.; Joslin, Elizabeth S.
**Patterns of Response in the Perception of Braille Configurations.**
EDRS not available
New Outlook Blind; V63 N8 P232-44 Oct 1969

Descriptors: exceptional child research; visually handicapped; tactual perception; programed materials; braille; tachistoscopes; discrimination learning; reading speed

To examine the relationship between stimulus presentation and response on a programed tachistoscopic instructional device, and the effect of a remediation program on this relationship and on the speed of braille reading, 27 subjects in grades 3 through 9 were studied (ages ranged from 110 to 212 months, mental ages from 93 to 269 months, and IQ's from 65 to 144). The subjects were divided into two groups, one using a programed learning device, the other traditional braille materials. The results indicated reading errors increased as speed of presentation increased; subjects with higher IQ's made fewer errors on programed material than those with lower IQ's; certain letters in traditional braille were more difficult than others (R, Z, and N) seemingly due to lack of characteristic forms; and the group using the remediation device demonstrated an increase in reading rate of three and one half words per minute over the control group. (JP)

### ABSTRACT 20505

EC 02 0505 ED N.A.
Publ. Date Aug 66 8p.
Rush, Mary Lou
**Use of Visual Memory in Teaching Written Language Skills to Deaf Children.**
EDRS not available
Journal of Speech and Hearing Disorders; V31 N3 P219-26 Aug 1966

Descriptors: exceptional child research; aurally handicapped; language skills; written language; writing skills; programed instruction; retention; programed materials; positive reinforcement; testing; language handicapped

The use of programed material in teaching written intermediate language to deaf children was investigated. Subjects were 38 residential school students, aged 11 to 17 years, with IQ's ranging from 58 to 124 on the Leiter International Performance Scale. The program consisted of 219 frames requiring a total of about 2 hours. The frames were designed to teach such written language as destinations (house, to school, upstairs), various familiar verbs and verb endings (going, walking, to be, is/are), and the definite article (the) with gradually increasing recall necessary. The posttest mean was significantly above the pretest mean (.01 level). Kind and frequency of errors followed the same order on both tests. Retesting of some students at 2 and 4 weeks after the posttest showed no difference in means. Retesting of 12 other students at 10 weeks showed a significant (t equals 2.45) difference in means; however, the mean of retention scores remained significantly above the mean of pretest scores. Indications were that training in short term memory, programed instruction, and positive reinforcement can aid in establishing memory traces for language acquisition. (JM)

### ABSTRACT 20560

EC 02 0560 ED N.A.
Publ. Date Nov 66 14p.
Heinich, Robert
**Application of Systems Concepts to Instruction.**
EDRS not available
American Annals of the Deaf; V111 N5 P603-16 Nov 1966

Descriptors: exceptional child education; audiovisual instruction; curriculum; programed instruction; instructional technology; instructional media; curriculum planning; student teaching; programed instruction; curriculum development; media technology; systems analysis; systems approach; systems concept; systems development

A system is defined and the application of the systems approach to instruction and problems which have arisen in the relationship of parts to the whole with reference to media are discussed. Consideration is given to the fact that originally conceived as aids, audiovisual media are now self-contained and assume a major part of the teaching job, and that many decisions previously made on the classroom level have been shifted to the curriculum planning level, resulting in two classifications of instructional activity--mediated instruction and classroom instruction. This division permits three approaches, ranging from the classroom teacher's having complete responsibility for media used in the classroom, through shared responsibility, to completely programed or mediated teaching. Suggestions for teacher training programs are that they be designed to satisfy these three approaches, and that every student teacher be required to teach a substantial piece of content in his major field in mediated form. The problem of overloaded input in the systems approach and the preparation of curriculum and all materials by teams of specialists and submitted to local school systems to accept or to reject are also considered. (JB)

### ABSTRACT 20626

EC 02 0626 ED N.A.
Publ. Date Feb 65 3p.
Fitzgibbon, Walter C.

**Some Implications of Contemporary Research for Teaching the Mentally Handicapped.**
EDRS not available
Mental Retardation; V3 N1 P12-4 Feb 1965

Descriptors: exceptional child research; mentally handicapped; programed instruction; reinforcement; teacher role; environmental influences; teaching methods; teaching machines; educable mentally handicapped; research reviews (publications)

Research is discussed which indicates that although maternal deprivation may affect adversely a child's personality development, educational progress, or social development, physical absence of the mother is less crucial than the amount of sensory or social deprivation. Teacher-pupil interaction is mentioned as a way of reversing some of the damage from deprivation. A curriculum which includes short-term goals rather than a single, deferred goal is advocated because of retarded children's slower development rate and conceptual immaturity. A description of reinforcement learning includes the suggestions that rewards must follow shortly after desired responses and punishment should be minimized, but failure experiences must be built into learning tasks in order to develop reasonable expectations in the learner. Programed instruction is discussed as a time saving method which may not help learners in dealing with the social problems of living, but which may be useful to present facts, to give remedial work, and to develop specific skills. Findings are that programed instruction may have utility for retarded learners. (DF)

### ABSTRACT 20638

EC 02 0638 ED N.A.
Publ. Date 67 7p.
Olson, Jack and Others
**The Implications of Programmed Instruction on the Motivation for Learning in Hearing Impaired Children.**
EDRS not available
Audecibel; V16 N4 P189-93, 196-7 Fal 1967

Descriptors: exceptional child education; aurally handicapped; programed instruction; motivation; reading; sequential reading programs; reading programs; reading instruction; language; student motivation; learning motivation; programed materials; developmental reading; recreational reading; remedial reading

The prelingually deaf child experiences difficulty with both the expressive and receptive aspects of language which programed instruction attempts to overcome. This method is based on the following factors: the deaf can learn more easily if language structure is disassembled and presented in small sequential steps, correct responses are immediately reinforced, and success experiences while completing a program are used as a primary reinforcer and a challenge for learning. Aspects of programed materials for developmental, informative, recreational, and remedial reading are discussed indicating in all that programed materials should be interesting and stimulating, have controlled and continually reinforced vocabulary and small sequential steps, present challenging linguistic concepts, and be tested and satisfactory to a given criteria. Language concepts which can readily be taught by the classroom teacher should not be programed since programing is time consuming and expensive. Language programers for project LIFE (Language Instruction to Facilitate Education of Hearing Impaired Children) have found that once a deaf child learns to read informatively through programed instruction, his recreational reading is also enhanced, and it is suggested that of the various teaching methods presently being developed, programed instruction possibly holds the greatest promise as a supplemental and remedial teaching device. (SD)

### ABSTRACT 20788

EC 02 0788 ED 029 973
Publ. Date Dec 68 43p.
Sandhofer, Richard G.; Nichols, Jack L., Ed.
**The Development of Specialized Educational Programs for Poor Learners for Use in Non-Educational Settings. Final Report.**
Minneapolis Rehabilitation Center, Inc., Minnesota, Research and Development Division
Office of Education (DHEW), Washington, D. C.;
United Fund of Minneapolis, Minnesota
EDRS mf,hc
OEG-6-85-088
BR-5-0191

Descriptors: exceptional child education; adult vocational education; audiovisual instruction; autoinstructional aids; autoinstructional programs; experimental programs; individualized instruction; job skills; job training; material development; custodial training; program descriptions; programed instruction; machinists; slow learners; vocational rehabilitation; vocational education; instructional materials

Automated audio visual vocational training courses for duplication machine operator and janitor occupations are presented for poor learners to use in rehabilitation centers, state hospitals, etc. A description of program development includes: surveying pertinent literature in the field of program learning of occupations; visiting business and industrial concerns to determine trainee responsibilities; training curriculum development personnel; preparing, testing and revising subject matter; selecting a presentation system; intergrating the content and presentation system; and monitoring trainee performance in the completed program. The teaching system used contains programed question and response booklets, tape recordings, color slides, structured practice, and human supervision. The conclusion that programs imparted the necessary skills to poor learners, and could be effectively used in non-educational setting is made. Individualized vocational training for poor learners is noted to have some distinct advantages, along with techniques used with similar job training programs for other occupations. The development and reproduction of the programs is reported to be time-consuming, difficult and costly. (FP)

### ABSTRACT 20918

EC 02 0918 ED 019 805
Publ. Date Apr 67 11p.
Lazar, Alfred L.; Gelhart, Robert P.
**A Selected Bibliography on Teaching Machines and Programed Instruction.**
Colorado State College, Greeley, Rocky Mountain SEIMC
EDRS mf,hc

Descriptors: exceptional child education; teaching methods; programed instruction; bibliographies; teaching machines; methods research; educational research; instructional technology; handicapped children: autoinstructional aids; programed materials; research projects; periodicals; books

The bibliography lists 131 selected publications on teaching machines and programed instruction. Listed under books are 55 items dating from 1959 to 1966. Articles and periodicals cited date from 1915 to 1965 and number 53. Included as miscellaneous publications are 23 listings such as theses, project reports, government publications, and dittos ranging in date from 1949 to 1966. (JD)

### ABSTRACT 20957

EC 02 0957 ED 033 497
Publ. Date Feb 67 68p.
Stark, Joel
**Programmed Instruction for Perceptually Handicapped Children with Language Difficulties. Interim Report.**
Stanford University, California
Office of Education (DHEW), Washington, D. C., Bureau of Research
EDRS mf,hc
OEG-4-6-068527-1587
BR-6-8527

Descriptors: exceptional child research; aphasia; discrimination learning; multisensory learning; material development; intermode differences; learning disabilities; language development; verbal stimuli; visual stimuli; visual discrimination; instructional materials; auditory discrimination; learning characteristics; language patterns; programed instruction; audiovisual instruction; educational equipment

Three projects were designed to develop and evaluate materials for use with aphasic children (perceptually handicapped with language problems). The first project presented stimulus pairs in varying modality conditions. Results suggested that, although the aphasic children were not capable of improving their auditory discrimination performance, they had some ability to improve discrimination performance in the visual and especially in the combined modalities. The second project, ongoing when

reported, studied the nature of auditory sequencing abilities in an optimally controlled environment and explored means of improving those abilities. Stimuli were presented in successive auditory, simultaneous auditory, or successive visual conditions; intensity, inflection, and configuration were varied. The third project, also ongoing, developed insturctional materials making maximal use of visual stimuli with primarily auditory programs designed to provide phrase structure and appropriate units. Appendixes, comprising over half of the document, report on the form program, the sequencing simuli and equipment, teaching programs, and stimulus items and scoring forms. (JD)

### ABSTRACT 20989

EC 02 0989 ED N.A.
Publ. Date Jun 66 8p.
Stepp, Robert E.
**A Speechreading Laboratory for Deaf Children.**
Nebraska University, Lincoln, Teachers College
EDRS not available
Volta Review; V68 N6 P408-15 Jun 1966

Descriptors: exceptional child research; programed instruction; aurally handicapped; learning; elementary school students; lipreading; audiovisual aids; autoinstructional methods; films; positive reinforcement

To study the feasibility of using a type of programed instruction for self study by the acoustically handicapped, 10 children (aged 5 to 8) were given filmed speechreading instruction. The children ranged from hard of hearing to profoundly deaf and from low average to superior intelligence. A speechreading laboratory, planned as an extension of the teacher, was designed containing an 8mm motion picture projector and a set of headphones. The children operated the cartridge film upon assignment word, and multiple word emphasis approaches were developed and used for the study. Reinforcement and confirmation of the learner and his progress were structured into the films, sometimes requiring overt responses. Results of the program, as recorded on film, indicated that the hearing impaired children could assume responsibility for some of their learning (unit vocabularies, for example) and that speechreading could be programed for individual learning. (JD)

### ABSTRACT 21154

EC 02 1154 ED N.A.
Publ. Date 70 5p.
Brown, Jerome; Arkebauer, Herbert J.
**Using the Language Master with Hearing Impaired Children.**
EDRS not available
Teaching Exceptional Children; V2 N2 P81-5 Win 1970

Descriptors: exceptional child research; aurally handicapped; instructional materials; teaching machines; audiovisual aids; programed instruction; self pacing machines; autoinstructional aids; language instruction; vocabulary development; Language Master

The use of the Language Master machine for vocabulary instruction with hearing impaired children was examined to compare its effectiveness with traditional teaching procedures. The results showed no significant differences in vocabulary gains between the two methods, but the authors suggested that the use of the Language Master provides the additional advantages of freeing the teacher from certain routine activities, and enabling the child to assume increased independence and participation in the learning process. (RD)

### ABSTRACT 21202

EC 02 1202 ED 027 759
Publ. Date Mar 69 6p.
Feldhusen, John F. and Others
**The Right Kind of Programmed Instruction for the Gifted.**
EDRS not available
NSPI Journal, Trinity University, 715 Stadium Drive, San Antonio, Texas 78212.
NSPI Journal; V8 N3 P6-11 Mar 1969

Descriptors: exceptional child education; feedback; gifted; individual instruction; learning processes; material development; programed instruction; programing; taxonomy; teacher developed materials; programed materials

The problems inherent in developing programed materials for the gifted are examined, and a list of 15 characteristics that programs for these children should include is discussed at some length. Appended is a list of over 25 references. (LS)

### ABSTRACT 21211

EC 02 1211 ED N.A.
Publ. Date Sep 69 16p.
Watts, W. J.
**The Rationale of Programmed Learning and the Place of the Teacher.**
EDRS not available
Teacher of the Deaf; V47 N397 P371-86 Sep 1969
Paper Presented at the Programmed Learning With Audio Visual Aids Conference, Gloucester, England, May 10, 1969.

Descriptors: exceptional child education; programed instruction; teacher role; educational technology; teaching machines; material development; instructional media; program evaluation; interpersonal relationship; aurally handicapped

It is my intention first of all to consider the place of the teacher of the deaf in a modern technological age. The reason for doing this lies in the fact that personal teaching is of such great value and can still do what presentation media and teaching aids cannot, but it should be saved for its own special function. The second section of this paper considers the rationale of programed learning, the third section summarizes the historical development of programed learning with deaf children, and the final section deals briefly with the application of educational technology in the future. (JM)

### ABSTRACT 21221

EC 02 1221 ED 003 622
Publ. Date Dec 63 84p.
Birch, Jack W.; Stuckless, E. Ross
**Programed Instruction and the Correction of Written Language of Adolescent Deaf Students.**
Pittsburgh University, Pennsylvania, School of Education
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEG-7-48-1110-188
NDEA-VIIA-978

Descriptors: exceptional child research; language; aurally handicapped; teaching methods; programed instruction; written language; grammar; material development; adolescents; measurement techniques; conventional instruction; programed materials; instructional technology; deaf; language skills; language usage; language instruction

Special programs for the deaf were developed to determine if grammatical errors in written language could be reduced. Preliminary analyses were made on the language of deaf students and used as a guide for the selection of grammar material to be programed. One control group and two experimental groups were used in the study. The samples consisted of adolescent deaf students who were assigned to one of the three groups. The first experimental group consisted of 57 subjects, the second of 52, and the control group of 105 subjects. The two experimental groups received two different treatments, while the control group received representative instruction. The treatments were divided into deductive and inductive forms of programs. Programed language instruction was demonstrably effective for teaching deaf students, particularly when coupled with conventional instruction and used skillfully. (JK)

### ABSTRACT 21230

EC 02 1230 ED 003 292
Publ. Date 64 59p.
Bornstein, Harry
**An Evaluation of High School Mathematics Programmed Texts When Used With Deaf Students.**
Gallaudet College, Washington, D. C.
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
CRP-1633

Descriptors: exceptional child research; aurally handicapped; mathematics; teaching methods; programed instruction; programed texts; achievement; comparative analysis; instructional technology; programed materials; plane geometry; algebra

A comparison was made of the rate and level of achievement of 150 deaf students resulting from the use of programed texts as against the usual lecture methods in high school mathematics. Each of four mathematics teachers had two comparable classes. The control group received information by simultaneous lecture and the experimental groups used the programed texts. Pre- and posttests were administered along with such achievement instruments as the Lankton

1st Year Algebra Test, the Blyth 2nd Year Algebra Test, and the Shaycroft Plane Geometry Test. The programed text classes in elementary algebra and plane geometry did not gain significantly over lecture methods. In intermediate algebra the programed text was favored. The rapid learning factor showed that in all but one case the average amount of time required for the programed classes equalled or excelled that allotted to the lecture classes. (HB)

### ABSTRACT 21233

EC 02 1233 ED 003 204
Publ. Date 31 Aug 64 52p.
Paulson, Casper F., Jr.
**Slow Learners, Competition, and Programed Instruction.**
Oregon State System of Higher Education, Monmouth
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEG-7-47-0000-221 R-30;NDEA-VIIA-1083

Descriptors: exceptional child research; mathematics; grouping (instructional purposes); programed instruction; slow learners; group behavior; feedback; group relations; reinforcement; autoinstructional aids; programed materials; algebra; competitive selection; learning experiences; modern mathematics; textbooks; teaching methods; heterogeneous grouping; homogeneous grouping; Teaching System

The effects of two postulated competitive conditions on groups of relatively slow learners were examined during the reported research. The two competitive conditions were: homogeneous grouping, as opposed to heterogeneous grouping, and public display of the performance of all members of a group, as opposed to individualized feedback. Four groups of 10 subjects from ninth grade algebra classes used portions of Modern Mathematics: A Programed Textbook, Course I. Instruction for all groups was automated by systems which presented knowledge of results. In two of the groups, this knowledge was presented on a display panel so that all members could see results for their entire group. In two other groups, students received performance results privately by means of signal lights at their own stations. An analysis of variance of first posttest scores indicated that homogeneous groups scored higher than the heterogeneous groups. The significant finding was that heterogeneous groups receiving public display of performance scored significantly higher gains than any of the other groups. Observation of the subjects during the experiment indicated that groups receiving public display of performance interacted and verbalized considerably, while those receiving private knowledge demonstrated virtually none of this behavior. (WB)

### ABSTRACT 21237

EC 02 1237 ED 003 654
Publ. Date 61 13p.
Price, James E.
**A Comparison of Automated Teaching Programs With Conventional Teaching Methods as Applied to Teaching Mentally Retarded Students.**
Partlow State School, Tuscaloosa, Alabama
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEG-701124 NDEA-VIIA-670

Descriptors: exceptional child research; mathematics; teaching methods; programed instruction; mentally handicapped; arithmetic; teaching machines; autoinstructional methods; problem solving; student improvement; institutional schools; programed materials

Two methods of presenting programed material and the effectiveness of the instruction on mental retardates were studied: answer construct (AC), which requires that the answer be written in, and multiple choise (MC), which requires that the correct answer be chosen and marked. The subjects were 36 students attending a state institution for the mentally retarded. Two experimental groups were designated and assigned. A third group (control) was established to receive conventional instruction. The subjects received instruction in arithmetic by means of teaching machines. Results on pretests and posttests indicated that the retarded child did adapt to programed learning and appeared to make as much progress as with conventional teaching, and in less time; also there were no significant differences between groups in amount learned in the subtraction course whereas the MC method resulted in considerable improvement contrasted with no improvement in the AC or conventional groups. (RS)

### ABSTRACT 21260

EC 02 1260 ED 003 602
Publ. Date Sep 62 70p.
Birch, Jack W.; Stuckless, E. Ross
**The Development and Evaluation of Programed Instruction in Language for Children with Auditory Disorders.**
Pittsburgh University, Pennsylvania, School of Education
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEG-7-36-150 VIIA-773

Descriptors: exceptional child research; language; teaching methods; programed instruction; aurally handicapped; language instruction; audition (physiology); auditory training; tests; written language; programed materials; instructional technology; language tests; language development

The feasibility of programing written language for the instruction of deaf children was studied. A program was developed and presented to a group of deaf children. A control group was taught the same lesson content by teachers. Data were processed by a computer. The total score reliability of the language tests was determined by the application of Rielon's formula (1939) to the composite scores. The experimental and control groups were tested for homogeneity of variance on composite scores and on each of six language variables, with an f-ratio computed on each. The hypothesis of a common population mean was examined by means of a t-test. Additional statistical procedures were used in daily record sheets, tests of retention, and original student responses. Observation made by the teachers provided anecdotal information. While the internal consistency of teacher instruction was higher than that of programed instruction, no significant difference was found between the mean scores on five of six language variables. The control group scored significantly higher on one variable. The programed instruction required less than one-half the time assigned to teacher instruction. Written responses were correct on over 90% of the frames. Less than 5% of the total responses showed uncorrected errors. Participating teachers reacted well to this method of written language instruction. (HB)

### ABSTRACT 21273

EC 02 1273 ED 003 817
Publ. Date 63 231p.
Stolurow, Lawrence M.
**Principles for Programing Learning Materials in Self-Instructional Devices for Mentally-Retarded Children. Final Report.**
Illinois University, Urbana
EDRS mf,hc
CRP-661

Descriptors: exceptional child research; programed instruction; mentally handicapped; instructional materials; teaching methods; recognition; recall (psychological); stimulus behavior; sight vocabulary; vocabulary development; student ability; verbal ability; programed materials; educable mentally handicapped; autoinstructional aids; teaching machines

Principles for programing instructional materials for teaching mental retardates were developed from concepts derived from a theory previously developed by the author. The theory placed emphasis on the cueing function in the stimulus control of behavior. Relevant sections of the theory and related research were described. Separate experiments were conducted for grouping and spacing of frames with common stimulus elements, recognition and recall, under stimulus control, sequencing complex associative paradigms to be taught in both a forward and backward direction; prompting versus confirmation sequences and overlearning in the automated teaching of sight vocabulary; prompting, confirmation, and vanishing in the automated teaching of a sight vocabulary; and applying a computer prepared program for automated frame writing. Some of the findings were as follow: optimum sequence of material for the learner could be contingent upon his aptitudes or abilities, explicit rules for generating programs could be built into the programing used by the computer in writing frames, use of a prompting stimulus-response (S-R) sequence produced more rapid learning than use of a confirmation S-R sequence, and a computer-prepared

program to generate instructional materials appeared successful in producing a change in the subject's ability to express himself. (RS)

### ABSTRACT 21466

EC 02 1466 ED 034 344
Publ. Date 69 49p.
**A Report of the 1969 Introductory and Advanced Institutes in Programed Instruction and Instructional Systems for Teachers of the Deaf.**
Southwest Regional Media Center for the Deaf, Las Cruces, New Mexico
Office of Education (DHEW), Washington, D. C., Media Services and Captioned Films
EDRS mf,hc
OEC-4-7000183-0183

Descriptors: exceptional child education; programed instruction; aurally handicapped; summer institutes; program evaluation; teacher education; teacher attitudes; teacher evaluation; program descriptions

To provide participants with intensive training in programed instruction, to make them more knowledgeable consumers of programed instruction materials, and to develop programing skills on a professional level so that they could apply the systems approach in development of instructional materials, two training institutes were initiated. A total of 44 teachers of the deaf participated in the institutes which lasted 5 weeks each during the summers of 1968 and 1969. Included are the calendar of events, the instructional program log, programed instructional material developed by the institutes, administrative details, social activities, and evaluations. The overall evaluation was that the institutes were well designed and helpful; a complete breakdown of evaluated areas is provided. Also presented are summaries of the evaluation, the instructor evaluation form, the consultant evaluation form, recommendations, and a roster and photograph of staff, instructors, and participants. (JM)

### ABSTRACT 21539

EC 02 1539 ED N.A.
Publ. Date Nov 65 5p.
Withrow, Frank B.
**The Use of Audiovisual Techniques to Expand Lipreading and Auditory Experiences of Young Deaf Children.**
Illinois School for the Deaf, Jacksonville
Office of Education (DHEW), Washington, D. C., Captioned Films for the Deaf Branch
EDRS not available
American Annals of the Deaf; V110 N5 P523-7 Nov 1965
Paper Presented at the Symposium on Research and Utilization of Educational Media for Teaching the Hearing Impaired (Lincoln, Nebraska, May 23-25, 1965).

Descriptors: exceptional child education; aurally handicapped; autoinstructional aids; instructional materials; audiovisual instruction; auditory training; lipreading; language development; teaching methods

The project was designed to provide practice in lipreading and auditory stimuli using autoinstructional materials. The four types of instructional materials emphasized were 8mm movies, colored opaque pictures, filmstrips and auditory tapes, and a cross reference system. These materials have the advantageous characteristics of quick accessibility, easy retrievability, simple adaptability to classroom or autoinstructional use, and teacher control of the order of presentation by means of the cross-indexing. Through these autoinstructional materials, lipreading and auditory training are reinforced and the child is required to participate actively. (MW)

### ABSTRACT 21541

EC 02 1541 ED N.A.
Publ. Date Nov 65 6p.
Karlsen, Bjorn
**A Research Basis for Reading Instruction of Deaf Children.**
Minnesota University, Minneapolis, Department of Special Education
Office of Education (DHEW), Washington, D. C.
EDRS not available
American Annals of the Deaf; V110 N5 P535-40 Nov 1965
Paper Presented at the Symposium on Research and Utilization of Educational Media for Teaching the Hearing Impaired (Lincoln, Nebraska, May 23-25, 1965).

Descriptors: exceptional child research; aurally handicapped; reading instruction; reading materials; visual learning; visual stimuli; teaching machines; programed instruction; educational methods; language instruction; Honeywell University of Minnesota Instructional Device

Support for a visual approach to teaching reading to deaf children and reviews of past research on reading instruction methods are presented. The visual method employs a newly developed teaching machine called the Honeywell-University of Minnesota Instructional Device, which has a three choice response system and is fully automatic with no auditory stimulus used. Phonetic color coding is used with fading techniques to diminish clues. Concept development including vocabulary, sentence structure, multiple meanings and idioms is stressed, and progress is measured by the child's performance with the machine. A first pilot study during the summer of 1964 was tried with nine prelingual deaf 5 and 6 year olds indicating favorable results, and a final report was to be available on August 31, 1966. (MW)

### ABSTRACT 21542

EC 02 1542 ED N.A.
Publ. Date Nov 65 10p.
Brehman, George E., Jr.
**Programmed Discrimination Training for Lipreaders.**
Illinois University, Urbana, Institute for Research On Exceptional Children
Office of Education (DHEW), Washington, D. C.
EDRS not available
American Annals of the Deaf; V110 N5 P553-62 Nov 1965
Paper Presented at the Symposium on Research and Utilization of Educational Media for Teaching the Hearing Impaired (Lincoln, Nebraska, May 23-25, 1965).

Descriptors: exceptional child research; aurally handicapped; lipreading; programed instruction; programed materials; educational methods; discrimination learning; autoinstructional aids; instructional films; teaching machines; audiovisual instruction; visual learning; Perceptoscope

The project was designed to construct and test programs for teaching lipreading using techniques in discrimination learning and programed instruction. The instrument used was the Perceptoscope with a teaching machine adaptor, and the programed materials consisted of thirteen 16mm films 400 feet in length. The subject watched the formation of sounds from various angles, chose the correct sound and formation pattern, and eventually attempted to duplicate what he saw while watching himself in a 90 degree mirror. The prompting stimuli were then slowly decreased. Results are not included as the project was not completed at the time of the report. (MW)

### ABSTRACT 21608

EC 02 1608 ED N.A.
Publ. Date Mar 70 4p.
Morin, Edward A.
**Programed Instruction: Today's Challenge in Educating Visually Handicapped.**
EDRS not available
Education of the Visually Handicapped; V2 N1 P8-11 Mar 1970

Descriptors: exceptional child education; visually handicapped; programed instruction; educational methods; autoinstructional aids; teaching machines; educational technology; individualized instruction

The potential of programed instruction with the visually handicapped is discussed. Advantages of programing mentioned are that it can meet individual needs at an accelerated pace; it provides for more accurate measurement and evaluation; and the student becomes directly involved in the learning process with immediate feedback on errors. Factors which must be considered are that the student's problems must be identified and matched to the program, and the logical sequential order of the program content must be controlled. Further research is needed concerning the influence of programing on affective behavior. (JM)

### ABSTRACT 21609

EC 02 1609 ED N.A.
Publ. Date Mar 70 13p.
Tobin, M. J. and Others
**Programed Learning for the Blind; Some Exploratory Studies.**
EDRS not available
Education of the Visually Handicapped; V2 N1 P11-23 Mar 1970

Descriptors: exceptional child research;

visually handicapped; programed instruction; educational methods; braille; science instruction; social studies; teaching machines; England

Six studies on programed learning for the blind are presented. The research is concerned with using programed instruction for teaching braille (two studies using two different programs), a project to develop and construct a braille teaching machine, use of a branching program to teach social studies, testing a science program, and evaluating the effectiveness of braille and audio presentation of programed materials. Each study is briefly described and tables of results presented. The general conclusions reached were that programed instruction is effective in teaching the visually impaired, that programing may be of value in all curriculum areas, and that in many cases programs for the sighted may be readily adapted for use with the visually handicapped. (JM)

### ABSTRACT 21663

EC 02 1663 ED 022 555
16p.

Gotkin, Lassar G.
**Games and Other Activities for Developing Language Skills.**
New York University, New York, Institute for Developmental Studies
EDRS mf,hc

Descriptors: auditory discrimination; educational games; kindergarten children; language development; language skills; manipulative materials; mechanical teaching aids; preschool children; programed instruction; teaching methods; visual discrimination; Alphabet Board; Language Master; Matrix Game

Dr. Gotkin has developed several ways to use effectively games and mechanical devices to teach language skills to preschool and kindergarten children. The matrix game, a set of pictures in columns and rows, which functions on the principles and methods of programed instruction, requires the child to discriminate symbols, pictures, and colors and to verbalize his answer. The telephone interview is used to induce the individual child to structure conversations as the teacher gives him thematic prompts over the telephone. A third method uses the Language Master (a tape recorder and a moving card holder) to make the child verbalize after he has been aurally and visually stimulated. Also, it provides the child with immediate feedback. The alphabet board is a board grooved with the shape of the letters of the alphabet into which the letters are placed, much as in a puzzle. This device helps disadvantaged children, especially, to learn to discriminate the shapes and names of letters and to realize that letters are a code for the spoken language. All of these methods are designed for supplementary tools for teachers. (JS)

### ABSTRACT 22765

EC 02 2765 ED 010 839
Publ. Date Dec 66 42p.
Coss, Joe Glenn and Others
**Effectiveness of Automated Visual Programed Instruction with Paraplegic and Other Severely Handicapped Students.**
Downey Unified School District, California
Office of Education (DHEW), Washington, D. C.
EDRS mf,hc
OEG-31-14-00410-5016
BR-5-0411

Descriptors: exceptional child research; teaching machines; physically handicapped; arithmetic; programed instruction; adolescents

Twenty eight severely physically handicapped patients (ages 12 to 21 years) participated in a study of the effectiveness of automated visual programed instruction. They were divided into four groups matched for reading level and intelligence, and were given one of three treatment modes: alternation between teaching machines and classroom, classroom only, and teaching machines only. Results showed that teaching machines were about two thirds more efficient in time, were most effective in combination with classroom teaching, and were most effective with subjects of lower intelligence. Classroom instruction became more effective as instructional material became more difficult, and machines could be adapted for various disabilities. (Author/RJ)

### ABSTRACT 22887

EC 02 2887 ED 040 539
Publ. Date Jul 68 27p.
Coleman, Thomas; Langberg, George
**An Automated and Programed Laboratory for Instruction in the Areas of Speech and Communication. Final Report.**
Ossining Public Schools, New York
New York State Education Department, Albany, Division of Research
EDRS mf,hc

Descriptors: exceptional child education; speech handicapped; speech therapy; programed instruction; autoinstructional methods; program evaluation; public schools; articulation (speech); educational methods; exceptional child research

An experimental public school speech therapy program is described, which offers automated, programed instruction in sound production and auditory training. The experiment includes self-teaching methods, as well as utilization of paraprofessional personnel under the supervision of a qualified speech therapist. Although the automated program was presented as a supplement to traditional speech therapy methods, an effort was made to evaluate its contribution to the accomplishment of therapy goals. Utilizing 28 subjects, the investigators compared articulation test scores of those who had received only traditional therapy with those who had received both traditional and automated therapy. Results indicated a significant improvement in articulation with those students who received combined treatment. Although the study was limited, it was felt that automated programing may represent an important instrumentality for accomplishing school therapy objectives (JB)

### ABSTRACT 23173

EC 02 3173 ED N.A.
Publ. Date 69 27p.
Cotten, Paul D.
**The Effect of Secondary Reinforcing Cues and Two Schedules of Reinforcement on Programmed Learning Using Mentally Retarded Individuals.**
EDRS not available
Southern Journal of Educational Research; V3 N3 P193-219 Jul 1969

Descriptors: exceptional child research; mentally handicapped; educable mentally handicapped; programed instruction; reinforcers; reinforcement

To test the effect of secondary reinforcing cues and intermittent scheduling on programed learning with the mentally handicapped, 40 noninstitutionalized educable mentally handicapped children were taught a spatial organization task and a word learning task. The apparatus allowed simultaneous, separate, or combined presentation of the primary reinforcer and two secondary reinforcing cues. Different schedules of reinforcement using different secondary reinforcers or no secondary ones were used. Results showed intermittent schedules of secondary reinforcement more effective than continuous ones on the spatial organization task. Combined cues were no more effective than single ones, and neither of the single cues was more effective than the other. No conclusive results were obtained for the establishment of a secondary reinforcer. (KW)

### ABSTRACT 23246

EC 02 3246 ED 011 065
Publ. Date Aug 66 45p.
Malpass, Leslie F. and Others
**Programed Reading Instruction for Culturally Deprived Slow Learners.**
MacDonald Training Center Foundation, Tampa, Florida
Office of Education (DHEW), Washington, D. C., Bureau of Research
EDRS mf,hc
OEC-2-7-068438-0069
BR-6-8438

Descriptors: exceptional child research; reading; disadvantaged youth; slow learners; programed instruction; programed materials; basic reading; teaching machines; workbooks; primary education; programed texts; culturally disadvantaged; reading instruction; beginning reading; vocabulary development; reading research; student evaluation

The effectiveness of programed instructional materials for teaching basic reading skills to slow learning, culturally deprived children (aged 6 to 9) was evaluated. The same materials had been previously evaluated with educable mentally retarded subjects (aged 10 to 16). To determine what modifications would be needed for use with younger students, 45 children were divided into one control group taught by traditional classroom

techniques and two experimental groups, one taught by machine, and one taught using programed workbooks. Each group received the same list of words selected by the authors. At the end of the experiment, the children were tested for vocabulary improvement. The scores of each group were statistically compared with those of every other group. The results showed a statistically significant improvement in vocabulary gain for the machine-taught group over the control group and for the workbook-taught group over the control group, but no significant difference was found between the machine-taught and the workbook-taught groups. The conclusion was that programed instructional materials tend to increase reading skills and are feasible for use with the population sampled. (LB)

### ABSTRACT 23247

EC 02 3247 ED 011 070
Publ. Date Mar 67 190p.
McClain, John D.; Kovacs, Frank W.
**Programed Instruction for Superior Students in Small High Schools.**
Clarion State College, Pennsylvania
Office of Education (DHEW), Washington, D. C., Bureau of Research
EDRS mf,hc
OEC-4-16-026 NDEA-V11B-451-1
BR-5-0706-1

Descriptors: exceptional child research; gifted; programed instruction; program evaluation; measurement techniques; innovation; rural schools; rural environment; high schools; demonstration projects; newsletters; information dissemination; secondary school students; parent school relationship; community support; Attitude toward Programed Instruction Inventory; Semantic Differential Scale

Superior students in rural high schools were given programed instruction in selected subject areas to determine whether a nondirective method of diffusing an innovation, like programed instruction, was appropriate for dissemination in a rural environment. The effects of the cooperative demonstration project on students, parents, teachers, and high school administrators were measured by the Attitude toward Programed Instruction Inventory and the Semantic Differential Scale. Results showed that predisposition of the individual to either adoption or rejection will affect the rate and final decision regarding the acceptance or rejection of the innovation. It was recommended that premeasures should be employed to determine the predisposition of the target population, and it was concluded that the nondirective method of diffusing an innovation was appropriate for the dissemination of programed instruction in a rural environment. Since the use of newsletters proved to be an important contribution to the success of the project, the use of similar means of communication with the target audience is advised when dissemination is an objective. (GD)

### ABSTRACT 23311

EC 02 3311 ED N.A.
Publ. Date 70 5p.
Pfau, Glenn S.
**Reinforcement and Learning--Some Considerations with Programed Instruction and the Deaf Child.**
EDRS not available
Volta Review; V72 N7 P408-12 Oct 1970

Descriptors: exceptional child research; aurally handicapped; programed instruction; adolescents; reinforcement; feedback; learning; deaf

An investigation was conducted to determine the influence of different types of immediate reinforcement upon programed learning by severely hearing impaired adolescent deaf students. A group of 208 subjects, aged 11 to 16 years, from three schools for the deaf, were asked to learn ten different animals by means of a program of instruction under varying conditions of immediate feedback. Results indicated that the type of immediate reinforcement had little effect upon errors either within, or at the termination of, the program. Findings and implications are discussed as related to classroom instruction. (Author/KW)

### ABSTRACT 23343

EC 02 3343 ED N.A.
Publ. Date 66 17p.
Metzger, Rolland
**Aspects of Arithmetic Learning in Mental Retardates.**
Dixon State School, Illinois
EDRS not available
Mr. Rolland Metzger, Dixon State School, Dixon, Illinois 61021.

Descriptors: exceptional child research; mentally handicapped; educable mentally handicapped; arithmetic; programed instruction; teaching machines; rote learning; retention studies; educational experiments; academic performance; institutionalized (persons); audiovisual aids

Teaching arithmetic to institutionalized EMH students was studied in three experiments to determine the efficacy of a teaching machine to teach elementary addition facts (15 subjects), to compare finger counting vs. rote learning of elementary arithmetic facts (24 subjects), and to test which confirmation technique (auditory, visual, or combined auditory and visual) is the most helpful in the retention of elementary arithmetic facts (60 subjects). Experimental equipment and procedures are described. The graphically illustrated results indicate that teaching machines and programing methods are successful with EMH students; EMH students can attain any reasonable level of performance on simple arithmetic problems if given sufficient practice; EMH students can learn arithmetic facts by rote and need not rely on finger counting; the programing of problems on an individual basis is feasible in the classroom if clerical assistance is available; and EMH students can learn about three fourths of a problem per 15 minutes of practice with a 28-day retention rate of 66%. (AP)

### ABSTRACT 23411

EC 02 3411 ED N.A.
Publ. Date Sep 70 9p.
Pfau, Glenn S.
**The Application of Programed Instruction Principles to Classroom Instruction.**
EDRS not available
Volta Review; V72 N6 P340-8 Sep 1970

Descriptors: exceptional child education; aurally handicapped; programed instruction; multimedia instruction; teaching machines; behavioral objectives; classroom techniques

Programed instruction for the deaf is described and related to traditional classroom instruction. The areas of behavioral objectives, overt responses, immediate feeback, hierarchic presentation, evaluation, reinforcement, and transfer are also discussed. (Author/RD)

### ABSTRACT 23445

EC 02 3445 ED 041 413
Publ. Date Sep 69 27p.
Tolor, Alexander
**An Evaluation of a New Approach in Dealing with High School Underachievement. Final Report.**
Fairfield University, Connecticut
Office of Education (DHEW), Washington, D. C., Bureau of Research
EDRS mf,hc
OEG-1-9-080044-0008(010)
BR-8-A-040

Descriptors: exceptional child research; learning disabilities; underachievers; expectation; reinforcement; motivation; high school students; academic achievement; computer assisted instruction; study skills; tutoring; internal-external expectation; Rotter Internal-External (I-E) Scale

A study was undertaken to determine the degree and nature of expectancy of reinforcement in high school underachievers, and to evaluate a method for modifying the internal versus external expectancies which relate to motivation or achievement and attainment of success. A computer instructional program was used to impart immediate reinforcement for the subject's responses, to show that his behavior, over which he has direct control, determines his success or failure. Underachievers were identified, and 16 were randomly assigned to a tutorial group, 16 to a study skill group, and 17 to the computer group for an eight-week period. It was found that sex and class level are important in determining the external expectancy tendency of underachievers. All three experimental approaches resulted in increased internality, without significant differences among the groups. Also, none of the approaches resulted in a significant change in grades earned by the underachievers. Rotter's internal-external (I-E) scale is included. (KW)

### ABSTRACT 23448

EC 02 3448 ED 041 414
Publ. Date 63 26p.
Gotkin, Lassar G.; Massa, Nicholas

**Programed Instruction and the Academically Gifted: The Effects of Creativity and Teacher Behavior on Programed Instruction with Younger Learners.**
Columbia University, New York, New York, Institute For Educational Technology
Carnegie Corporation of New York, New York;
New York State Education Department, Albany
EDRS not available
Center for Programed Instruction, 365 West End Avenue, New York, New York 10024.
Speech Delivered at the Meeting of the American Educational Research Association (Chicago, Illinois, February 13, 1963).

Descriptors: exceptional child research; gifted; programed instruction; teaching methods; creativity; academic achievement; elementary school students; teacher influence; student attitudes

A study was conducted to assess the effectiveness of programed materials developed for 8th graders, when used with academically gifted 4th and 5th graders. Also evaluated were the teacher's contribution to the effectiveness of the program, and the relationship between creativity and programed instruction. Eighteen 4th graders (mean IQ 135.6, as measured by the WISC) and 24 5th graders (mean IQ 134.5) were mixed in two experimental classes, each using a program building vocabulary skills. Supplementary instruction augmenting the program was provided by one teacher. Torrance's Tests of Creativity, previously administered, were used to form High and Low Creativity Groups. Pre and posttests for the first and second halves of the program were administered, as well as a questionnaire concerning attitude toward programed instruction. Results showed significant similar gains in knowledge for both 4th and 5th graders, regardless of their amount of previous knowledge; however, they did not achieve the level of mastery attained by 8th graders, for whom the program was designed. Statistical tables and sample frames are included. (KW)

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